



MULTI FUNCTION ANALYSERS MFA-CONDUCTIVITY

FOR THE MEASUREMENT OF CONDUCTIVITY

TECHNICAL INFORMATION

The new multi function analyser is a new generation of instruments for measurement and control applications in water treatment processes. This new development is the result of experience and cooperation within the worldwide **USF Wallace & Tiernan** group. The results are high performance electronic system components which guarantee accurate measurement and consistent control. Application areas range from simple measurement through to demanding closed-loop control processes for the treatment of swimming-pools, drinking and process water as well as waste water. The totally new development of the **MFA-conductivity** module is designed for connection to a **Wallace & Tiernan** 4-electrode analyser with integrated temperature sensor for automatic compensation.



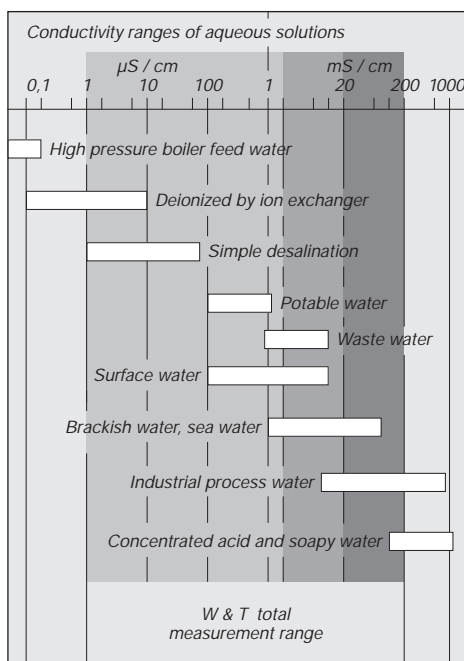
ADVANTAGES

- High precision and linearity through optimal cell geometry and integral temperature sensor fitted as standard
- Very large measurement range by one probe only
- Long-term stability of cell constant by high quality, non-abrasive carbon electrodes
- No measurement error due to changes in the surrounding floor and side wall contact
- Modern, user-friendly microprocessor technology with menu-driven dialogue
- Isolated signal inputs and outputs
- Modular design
- Luminescent display with adjustable contrast
- Plain-text menu assistance in a choice of 5 languages
- User-adjustable limit contacts
- RS485-interface
- CE mark (89/336/EEC)

MEASUREMENT OF CONDUCTIVITY

Most inorganic materials in water are present in ionised form – in other words, they separate into cations and anions and are capable of conducting electricity. This conductivity depends not only on the number of ions but also on their charge number, the ion mobility and the temperature of the water and thus represents a total parameter which allows conclusions about total mineralisation and constancy or change in the water.

Among the possible uses of conductivity determination are finding water supplies and water treatment, investigation of various groundwater strata and adjustment of the steady state with any control analyses. The conductivity measurement is therefore an important factor in all water analyses and is absolutely essential in hydrological studies.



THEORY OF OPERATION

The electrical conductivity (symbol χ ; specific conductivity) is the product of the conductance G (= reciprocal value of the resistance R) of the measuring medium and the cell constant K which results from the geometrical arrangement of the electrodes (distance l , area A).

$$\chi = G \times K \quad K = l / A$$

The unit is $s \cdot m^{-1}$ (Siemens/m).

Units $\mu S/cm$ and mS/cm are used in measuring the relatively low values in drinking and pool water.

In order to be able to compare the various measurements of conductivity the effect of the temperature on the measurement samples must be taken into account. Therefore conductivity χ is always related to the international reference temperature of 25 °C by means of the temperature coefficient α .

The continuous **MFA** conductivity measuring system comprises a through-flow assembly, a measuring probe, and a microprocessor controlled **MFA** module. The conductivity probe is a 4-electrode system with integral temperature sensor. The shaft of the probe is made of rugged epoxy. The electrode material is non-abrasive carbon and can be mechanically cleaned.



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TECHNICAL DATA

MFA MODULE FOR THE MEASUREMENT OF CONDUCTIVITY

Selectable Measuring Ranges:

0 ... 2000 $\mu\text{S}/\text{cm}$

0 ... 20.00 mS/cm

0 ... 200.00 mS/cm

User-selectable to NaCl display in mg/l and %.

Display flashes if measuring range is exceeded.

Adjustable sensor parameters:

Measuring frequency – 540 Hz / 1300 Hz

Cell constant K – 0.40 ... 5.00 cm^{-1}

Temp. coefficient – 0.10 ... 9.99%/K

Analogue Output:

0/4 ... 20 mA

Isolated up to 500 V relative to earth

Load $\leq 600 \Omega$, accuracy $\pm 0.2\%$ FS

Temperature drift 0.1 % / 10 K

Ambient Temperature:

0 ... 50 °C

Temperature Compensation for Sample Water:

-5 ... +90 °C for NTC,

Pt100 and AD 592 or manual in °C / °F

Switching Outputs:

For up to four limit contacts

or two limit contacts

and control output

(for positioner / metering pump)

max. 1250 VA to 250 V AC

max. 150 W to 220 V DC

Digital Input:

(e.g. for sample water monitoring)

Selectable 24 V, 115 V, 230 V AC

or own supply for isolated contacts

Interface:

RS485 asynchronous complying with EIA RS485

DIN 66259 T4 or ISO 8482,

19200 baud, non-isolated

Power Supply:

115/230 V $\pm 10\%$, 50-60 Hz, 14 VA

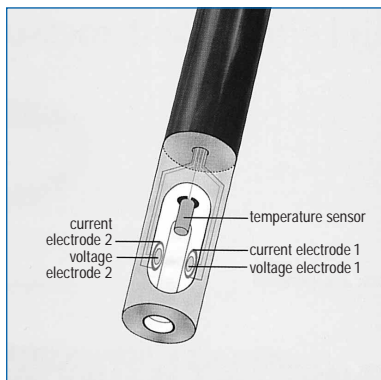
24 V DC to EN 61131-2

Module dimensions (W x H x D):

76 x 129 x 175 mm (incl. contact strip)

Weight (incl. packing):

1.8 kg



4-electrode cell incl. temperature sensor

CONDUCTIVITY PROBE (U-95 997)

Measuring cell:

4-electrode system

Measuring Parameters:

conductivity, temperature (NTC)

Accuracy (including repeat accuracy):

< 1.5 % FS

Measuring Principle:

4-wire measurement

Temperature Range:

-5 °C ... +90 °C

Response Time:

< 12 s

Cell Constant:

0.61 $\text{cm}^{-1} \pm 1.5\%$

Minimum Immersion Depth:

40 mm

Material:

Measuring cell shaft Epoxy

Temperature sensor Stainless steel 1.4571

Electrode Graphite

Storage Medium:

Air

Measuring Cell Dimensions:

Shaft length 120 mm

Shaft diameter 21 mm

Cable length 1.5 m

MFA PLUG-IN TYPE MODULE

Can also be combined with other MFA modules, for example chlorine, pH, redox etc.

Triple Wall-Mounted Housing:

Dimensions (W x H x D): 360 x 266 x 235 mm

Weight: 2.8 kg

Enclosure: IP 66

Triple Housing for Panel-Mounting:

Dimensions (W x H x D): 288 x 144 x 195 mm

Weight: 1.7 kg

Enclosure: IP 41 (IP 65 with cover)

Single Housing for Wall-Mounting:

Dimensions (W x H x D): 210 x 266 x 235 mm

Weight: 1.5 kg

Enclosure: IP 66

Single Housing for Panel-Mounting:

Dimensions (W x H x D): 144 x 144 x 195 mm

Weight: 1.2 kg

Enclosure: IP 41 (IP 65 with cover)

(Weights include packaging)

US WALLACE & TIERNAN

a U.S. Filter Company

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